

“Role of entrepreneur’s perspective of waste management for coffee shop sustainability”

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ARTICLE INFO	Muhammad Alfarizi, Palupi Lindiasari Samputra and Nor Isnaeni Dwi Arista (2023). Role of entrepreneur’s perspective of waste management for coffee shop sustainability. <i>Problems and Perspectives in Management</i> , 21(4), 502-515. doi: 10.21511/ppm.21(4).2023.38
DOI	http://dx.doi.org/10.21511/ppm.21(4).2023.38
RELEASED ON	Thursday, 30 November 2023
RECEIVED ON	Monday, 18 September 2023
ACCEPTED ON	Thursday, 16 November 2023
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

81



NUMBER OF FIGURES

2



NUMBER OF TABLES

6

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BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 18th of September, 2023
Accepted on: 16th of November, 2023
Published on: 30th of November, 2023

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Arista, 2023

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Conflict of interest statement:
Author(s) reported no conflict of interest

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ROLE OF ENTREPRENEUR'S PERSPECTIVE OF WASTE MANAGEMENT FOR COFFEE SHOP SUSTAINABILITY

Abstract

The development of the coffee business as a small and medium enterprise (SME) shows positive things with the increasing number of coffee, which means an abundance of existing coffee grounds. There is a lack of research on entrepreneur perspectives on coffee waste management. This study aims to analyze the perspective of coffee shop entrepreneurs in managing coffee waste and converting waste into alternative energy for sustainable and environmentally friendly prospects. Respondents in this study were 201 coffee shop owners in Bekasi, Indonesia, who received questionnaires using the snowball sampling technique; for data analysis, the paper used PLS-SEM. This study found that the entrepreneur perspective significantly affects coffee waste management, encouraging the sustainability of coffee shops. The results of the R-Square analysis show that coffee shop owner awareness is strongly influenced by coffee waste management knowledge (93.6%); the attitude of coffee shop owners is influenced by coffee waste management knowledge and coffee shop owner awareness (92.5%); and the coffee waste management behavior is influenced by coffee shop owner awareness and attitude of coffee shop owners (97.8%). In addition, entrepreneurs' excellent attitudes and awareness toward the potential of coffee grounds encourage them to carry out better waste management through sorting procedures to convert coffee grounds into alternative energy.

Keywords

coffee ground, creative industry, entrepreneur
perspective, innovativeness, SME, waste management

JEL Classification

L26, M10, M12, O30

INTRODUCTION

Indonesian coffee consumption is 5 million bags (with one bag equivalent to 60 kg) (International Coffee Organization, 2021), so it is increasingly producing much solid waste, namely coffee grounds waste. Every cup of coffee with coffee grounds weighs an average of 20 grams (Kang et al., 2020); 80% of the weight of coffee beans that have been brewed remains as coffee grounds, which then become waste, usually disposed of by burning or landfilling, causing environmental problems (Nguyen et al., 2021; Huseini et al., 2018).

Research on converting coffee grounds waste into alternative energy products to support a circular economy (Brunerová et al., 2020; Tarigan et al., 2019) and consumer preferences and the understanding of baristas (coffee-making actors) in consuming and purchasing coffee have been widely studied (Servín-Juárez et al., 2021; Purnomo et al., 2019). Coffee grounds conversion has been proven, while the coffee shop actor is the leading actor in managing coffee waste. However, the main actor who orders is a businessman or shop owner.

The main problem is that there needs to be an assessment of coffee shop owners' behavior in managing coffee grounds waste as sustainable in Indonesia. This study emphasizes coffee waste management, which begins with exploring the perspectives of coffee shop entrepreneurs, including knowledge, awareness, behavior, and attitude in suppressing the abundance of coffee grounds and converting the waste into valuable things such as sustainability.

1. LITERATURE REVIEW AND HYPOTHESES

Coffee grounds waste can be toxic to the environment due to its caffeine, tannins, polyphenols, and carbon (Torabzadeh et al., 2022; Yun & Kim, 2019). From an agricultural perspective, coffee grounds can be used as fertilizer to support plant growth as a liquid fertilizer (Kasongo et al., 2011), nitrogen in coffee grounds, namely ammonium (NH_4) and nitrate (NO_3) (Koo et al., 2019), phosphorus in coffee grounds (Kang et al., 2020), and as fertilizer for hydroponic vegetable crops and palm oil (Andreola et al., 2019; Weber, 2016; Usman & Nanda, 2017; Yudanur et al., 2022). The health side has proven the benefits of coffee grounds through further experimental research on coffee content. Coffee grounds are rich in polysaccharides manno oligosaccharides polymers used as dietary fiber, immunostimulating activity, and prebiotic (Campos-Vega et al., 2015; Salazar-López et al., 2019; Wongsiridetchai et al., 2021; Zhang et al., 2021). Many studies promote the antioxidant properties of coffee that have been linked to the presence of natural substances and those produced during roasting (Iriando-DeHond et al., 2019; Vázquez-Sánchez et al., 2018; Ramírez et al., 2021). Coffee grounds waste can be an alternative energy source for biodiesel production (fuel) (calorific value 21.16 MJ/kg^{-1}) (Dodos et al., 2021). Biorefinery integrated with coffee grounds waste produces various biofuels and value-added products, which is an auspicious approach (Rajesh et al., 2020). Biopellet has a calorific value of $5,000 - 5,100 \text{ cal / g}$ or equivalent to the calorific quality of low-energy coal (Firmanda et al., 2023). In another case, the incineration of coffee grounds waste in pellets reduces Nox emissions due to the synergistic effect on combustion (Kim et al., 2022). However, coffee grounds have cross-sectoral health, agriculture, and alternative energy benefits. Employees in the coffee shop business are encouraged to fix the coffee grounds problem by their supervisors' behavior.

1.1. Coffee shop owners' innovativeness

Diffusion innovation theory is the leading innovation acceptance theory often applied to the adaptation of research innovations in general and studies that focus on innovation adaptation (Thakur et al., 2016). It is a series of events in which a person develops initial knowledge about an innovation, establishes an opinion about it, and decides to adopt or reject it (Walley et al., 2017). The characteristics of individual business owners who have innovative behaviors are: 1) Finding out innovative knowledge, processes, techniques, and new ideas, 2) Generating creative ideas, 3) Advancing and championing ideas to others, 4) Researching and providing the necessary resources to realize new ideas, 5) Developing a mature plan and schedule to realize the new idea, and 6) Staying creative (Pilav-Velic et al., 2020; Stauffer, 2015). The innovation-decision process comprises five stages: knowledge, persuasion, decision, execution, and endorsement. If adaptation occurs, the implementation stage is said to be ongoing in a process that reflects aspects of a person using innovation.

The diffusion of innovation states that the confidence of a businessman in viewing a system or technology or the latest innovations is synthesized from mass or social media information (Lian & Yen, 2017). The diffusion innovation theory was born to investigate personal traits in adoption behavior as an internal motivational stimulus (Gur-Erdogan et al., 2014). It has examined the importance of this theory for the benefit of downstream research that is beneficial to the development of human civilization (Thakur et al., 2016; Hateftabar, 2023; Abubakre et al., 2022). The empowerment of coffee shop owners in waste conversion should be investigated. Moreover, the sustainability of the results of empowerment in the form of the shop owner's knowledge perspective on their actions in waste management is essential to study.

1.2. Hypotheses development

The ability to innovate has always contributed to a business's success. Organizations with a solid motivation to innovate and a climate that allows them to drive innovative ideas will innovate quickly and successfully (Walley et al., 2017). Top-line management knowledge, especially from the production department, is essential in the awareness and management of alternative products for allergen consumers (Kwon et al., 2020; Sogut et al., 2015). This study assumes that the knowledge of coffee shop owners regarding the content of coffee grounds in terms of chemical compounds, the environmental implications, and the external habits of managing coffee grounds will encourage their awareness of the potential negative and positive coffee grounds. Business owner knowledge is critical to integrating processes and human resources in innovations.

Knowledge is one of the factors that influence the formation of a person's attitude. Based on previous research, the knowledge of qualified business owners in processing product raw materials forms a strategic and positive business management attitude (Taneo et al., 2020). Research on knowledge perspectives that drive the attitudes of culinary industry owners is very often discussed in raw material safety management (Ramnauth et al., 2008; Choudhury et al., 2011), street food marketing practices (Alhashim et al., 2022), and food waste recycling (Lang et al., 2020). In addition to comprehensive knowledge, business owners need awareness to manage innovative raw materials obtained (Schniederjans et al., 2021). Previous literature directly illustrates the relationship between the awareness of owners of the agribusiness industry and the attitude of vegetable waste management with nanotechnology (Handford et al., 2015). Business owners with a high awareness encourage the innovative behavior of maximizing resources (Akpan et al., 2022). The assessment of culinary business owners' knowledge of business owners' awareness has been studied. An owner's knowledge of raw materials and their production and post-production implications will encourage owners to realize the impact of their business on competitive, environmental, and macroeconomic aspects. Awareness of innovation is an essential aspect of innovative business management be-

cause awareness of innovation is a form of business owners' concern for the progress of their business so that various innovative actions are born into the business.

Meanwhile, the awareness of behavior was significant for decisions in packaging environmentally friendly beverage products and Brazilian Food Parks Social Innovation (Birgelen et al., 2009; Bispo & Almeida, 2020). Previous empirical studies found that culinary MSME owners' awareness of digital payment innovation promotes managed financial management behavior (Akpan et al., 2022; Coffie et al., 2021; Nugraha et al., 2022; Wiyono & Kirana, 2021). Entrepreneurial leadership positively influences SMEs' organizational innovation and employee creativity (Naushad, 2022). Coffee shop owners must have qualified abilities in the selection of coffee raw materials and the production process of quality drinks. Indonesia already has a standardization program for coffee owners with output, namely coffee owners who hold competency certificates with the ability to select standards and process upstream to downstream processing coffee beans into a delicious beverage creation. This certification is also related to the post-production waste treatment of coffee drinks. Hence, aspects of knowledge must be tested as a research construct variable to investigate the personal innovations of coffee shop owners.

Attitude is a reaction that there is an element of assessment of the object that ultimately directs the behavior latent (Hasan et al., 2021). Attitudes have a significant influence on the behavior of Indonesian Halal culinary MSME owners in using cashless payment innovations (Qurniawati & Nurohman, 2020). This is strongly related to the coffee shop owner's environmental awareness of the potential of coffee grounds that can be utilized to obtain additional indirect economic value while reducing the harmful effects of coffee grounds as waste.

Therefore, from the above discussion on the coffee shop, (1) most of the studies are in the circular economy; (2) entrepreneurial perspectives have been measured; and (3) no study has been cited in Bekasi, Indonesia. This study aims to analyze the perspective of coffee shop entrepreneurs in managing coffee waste using the PLS-SEM method.

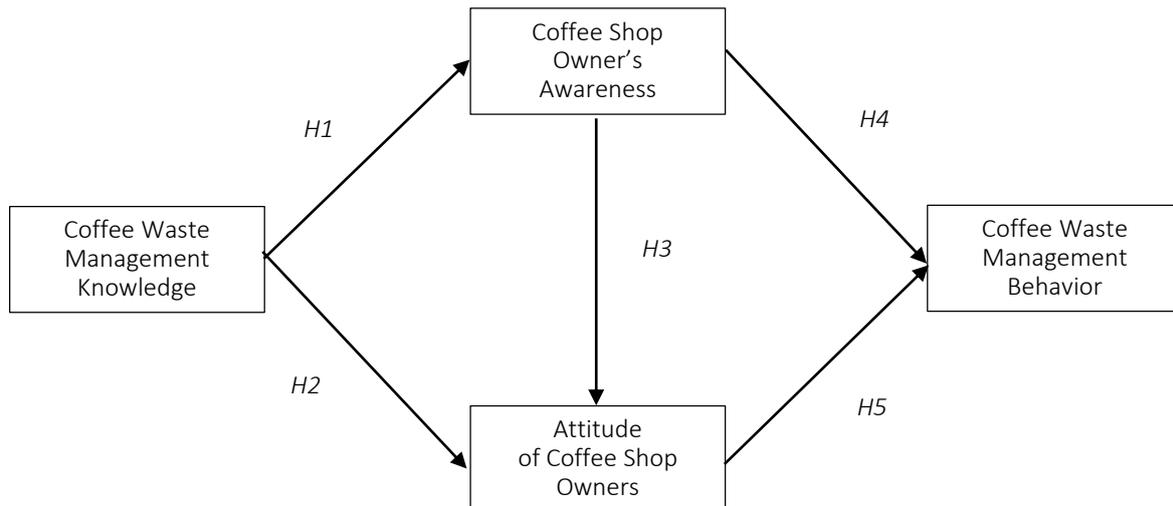


Figure 1. Proposed hypothesized model

These perspectives include knowledge, awareness, behavior, and attitude.

The following hypotheses are tested to support the objectives of this study (Figure 1):

- H1: Coffee waste management knowledge has a significant effect on coffee shop owner's awareness.*
- H2: Coffee waste management knowledge has a significant effect on the attitude of coffee shop owners.*
- H3: Coffee shop owner's awareness has a significant positive effect on the attitude of coffee shop owners.*
- H4: Coffee shop owner's awareness has a significant positive effect on coffee waste management behavior.*
- H5: Attitude of coffee shop owners has a significant positive effect on coffee waste management behavior.*

2. METHODOLOGY

This analysis targeted coffee shops in Bekasi (Bekasi City and Bekasi Regency), West Java, Indonesia. The increase in coffee consumption is driving the growth of coffee shops in several regions, one of which is Bekasi, Indonesia. This study took the

object of Bekasi because the coffee community is Indonesia's most significant coffee drink connoisseur community (Charisma et al., 2022). The coffee shop business tends to increase every year in Bekasi; even in the 2018 to 2019 range, there was a significant increase in Bekasi City by 776%.

2.1. Data and variables

The latest data (Figure 2) update in 2021 shows 2752 cafes in Bekasi City and 981 cafes in Bekasi Regency (Open Data Jabar, n.d.), meaning that SMEs in the form of cafes have a high chance to continue to be developed. The exact number of micro-scale and small-scale coffee shops has yet to be discovered. Conditions in the field require the use of snowball sampling techniques.

This study relied on both primary and secondary data sources. Primary data are information gathered directly from consumers of local coffee shops and coffee shop franchisees through the completion of questionnaires. Secondary data, on the other hand, are gathered indirectly or through research in journals, books, statistical data, and the Internet. The number of respondents should be adjusted to the number of questions, assuming $n \times 5$ observed variables (indicators) up to $n \times 10$ observed variables (indicators) (Hair et al., 2010). In this study, 17 question items were used to measure four variables: 17 questions multiplied by 10, equal to a minimum of 170 respondents. The study has fulfilled the required number of samples. In order to strengthen the data, the number of respondents was 201. Qualitative

Source: Open Data Jabar (n.d.).

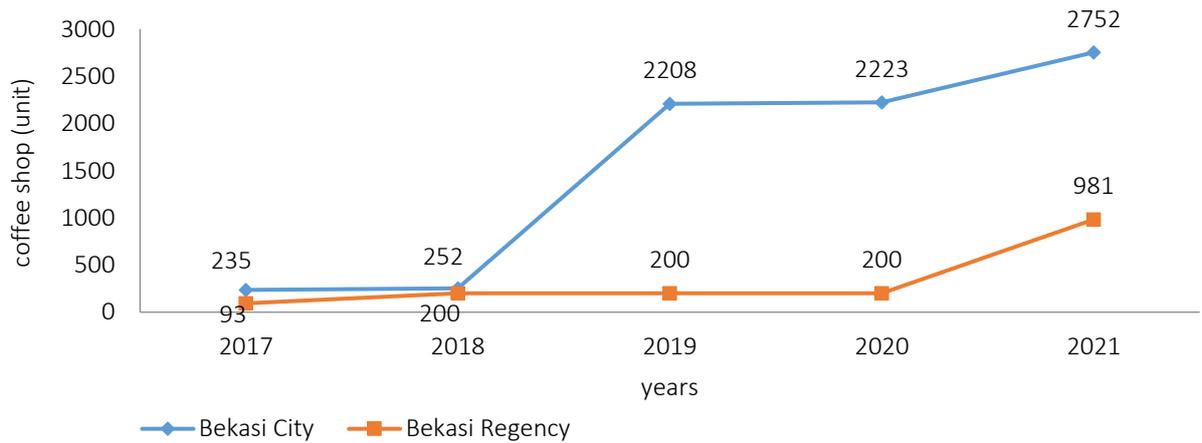


Figure 2. Growth of Bekasi coffee shops

analysis uses descriptive technique, while quantitative analysis uses partial least square (PLS) with SmartPLS Version 3. In the PLS method, the sample size for SEM testing models is 100-200 (Hair et al., 2017b). This analysis involved four variables: coffee waste management knowledge, coffee shop owner’s awareness, the attitude of coffee shop owners, and coffee waste management behavior (Table 1).

2.2. PLS-SEM analysis

PLS is an analytical method used to analyze complex things that combine regression with path analysis to test direct relationships between vari-

ables (Memon et al., 2021). In PLS, there are measurement and structural models. The measurement model is the relationship between the observed grain and the latent variable, while the structural model explains the relationship between latent variables (Hair et al., 2017a). The measurement model must be valid and reliable, while the structural model is assessed by evaluating the path coefficient’s explanatory power and degree of significance (Sarstedt et al., 2019).

Figure 1 shows the four variables, and five hypotheses have been established according to the arrow path of the research study. The PLS-SEM model

Table 1. Variable indicators

Variable	Indicators
Coffee Waste Management Knowledge	Understanding the chemical content of coffee grounds waste
	Understanding the value of energy in coffee grounds waste
	Understanding the economic value of coffee grounds waste
	Insights into coffee grounds waste management as alternative energy (briquette fuel or environmentally friendly fertilizer)
Coffee Shop Owner’s Awareness	Awareness of the negative impact of coffee grounds
	Awareness of the use value of coffee grounds
	Awareness of alternative energy sources of coffee grounds
	Potential awareness of businesses made from coffee grounds
Attitude of Coffee Shop Owners	Awareness of profit opportunities for coffee grounds
	Maximum coffee enjoyment by utilizing the whole coffee to waste pulp
	The use of coffee grounds has a positive impact on the environment
	Reduction of coffee grounds waste as waste produced by coffee shops
Coffee Waste Management Behavior	Responsibility of all internal parties of the coffee shop in managing waste
	Seeing coffee grounds waste not as garbage
	Seeking to repurpose coffee grounds for the manufacture of alternative energy (fuel briquettes or environmentally friendly fertilizers)
	Efforts to maintain the quality of coffee grounds through the separation of unique storage tubs for coffee grounds
	Creative ideas for alternative energy from coffee grounds

is suitable for use because it is a variant-based approach and is a predictive model (Ghozali & Latan, 2019). The PLS analysis technique is carried out in two stages. The first stage is the measurement model test, which tests each indicator's construct validity and reliability. The second stage tests the structural model, which aims to determine whether there is an influence between variables using the t-test.

3. RESULTS

Bekasi, Indonesia, is a location to study coffee grounds waste management because it has many coffee shops – 3,733 (Open Data Jabar, n.d.). The study of the calculation of the Household Waste Control Index in Bekasi City is in the moderate category (5.86 out of 10), and the governance of home waste management at the community level still needs to be addressed (Ferdinan et al., 2022). However, research on waste management in SMEs still needs to be completed. Based on this study, the management of coffee grounds waste shows that not all coffee shops carry out proper management, so only 29.35% separates coffee grounds from other waste. On the other hand, a coffee shop creates a positive social impact because it creates new jobs for the community and encourages the development of business opportunities.

Table 2 shows that this study obtained 201 coffee shop entrepreneurs in Bekasi, Indonesia, with the majority of respondents aged 19 to 25 years; this characteristic is unique in connection with the phenomenon of Millennial Generation drinking coffee amid job demands that require focus energy and critical thinking. In addition, with the relatively young age of the owners, accepting coffee grounds waste treatment innovations is straightforward to implement. On the education side, the owner of the coffee shop is a high school graduate, followed by a bachelor's degree. This point is essential for Indonesia: young people become entrepreneurs to innovate in business operations.

Most of the respondents are still at the stage of growing (less than one year of operation) and developing (1-2 years of business establishment), so there is still time to implement business innovations, especially alternative energy. Most coffee

shops' human resources side already has 3-4 employees. Coffee shop income per day is still at the minimum standard of coffee shop business income in Indonesia, above IDR 1,000,000 – IDR 1,500,000 (Table 2). However, most shopkeepers stated that the place where they do business today is a place to rent. The study also wants to clarify that a small percentage of coffee shop owner respondents are unaware of the ownership status of the building due to the origin of the grant or the granting of family descendants.

Table 2. Respondent descriptive analysis

	Frequency	Percentage
Owner's age		
<19 years	17	8.5%
19-25 years	137	68.2%
26-30 years	24	11.9%
31-35 years	10	5.0%
35-40 years	2	1.0%
>40 years	11	6.0%
Owner's education level		
Primary school	1	0.5%
Junior high school	5	2.5%
High school	153	76.1%
Bachelor/diploma	42	20.9%
Length of business (years)		
< 1 year	116	57.7%
1-2 years	66	32.8%
3-4 years	14	7.0%
5-6 years	2	1.0%
>7 years	3	1.5%
Number of employees		
1-2 people	26	12.9%
3-4 people	96	47.8%
5-6 people	44	21.8%
7-8 people	23	11.5%
9-10 people	4	2.0%
11-15 people	4	2.0%
>15 people	4	2.0%
Average income per day		
<IDR 1,500,000	140	69.7%
IDR 1,500,000 – IDR 3,000,000	49	24.4%
>IDR 5,000,000	12	6%
Ownership status of business place building		
Contract/lease	102	50.7%
Family owned	6	6%
Own	86	42.8%
Do not know	7	3.5%

Outer models are used to test validity and reliability (Table 3). The criteria for assessing the outer model include convergent validity, discriminant validity, and reliability. The convergent validity

assessment is carried out by looking at the value of the loadings factor and the average variance extracted. Furthermore, a reliability test was carried out to measure the consistency of respondents' answers. The reliability test can be measured using Cronbach's alpha and composite reliability. A construct is reliable if Cronbach's alpha and composite reliability are more than 0.7 (Hair et al., 2019). The reliability analysis results in Table 3 show that the composite reliability and Cronbach's alpha values have met the criteria according to the rule of thumb. When viewed from the loading factor, the reflective measure is good if the value is more than 0.70; constructs with a value of less than 0.70 must be removed or dropped to produce a better model than before (Purwanto & Sudargini, 2021). The results show that each variable construct has an indicator scale value above 0.70. In addition to the loadings factor, the average variance extracted (AVE) is one of the parameters for assessing the convergent validity. A latent variable is valid if the AVE value is more significant than 0.5. The recommended AVE value should be more than 0.5, meaning that 50% or more of the variance of the indicator can be described (Sarstedt et al., 2019).

The AVE value in Table 3 already shows a value greater than 0.5. This means that the model's validity can produce a better model than the previous one.

The test results of the Fornell-Larcker method in Table 4 show no discriminant validity indicators. All variables accepted in this study are mutually exclusive and support the validity of discriminants between each variable. It shows that discriminant validity testing was carried out using Fornell-Larcker by comparing the square roots of each AVE value obtained on variables displayed diagonally with the correlation coefficient (off-diagonal) (Afthanorhan et al., 2020).

The results of the discriminant validity analysis of both Fornell-Lackerr and HTMT showed that the model had been discriminatory good (Table 5). Reliability testing used the heterotrait-monotrait ratio (HTMT). The heterotrait-monotrait test (HTMT) provision is said to have met the discriminant validity if the value obtained < 0.90 (Hair et al., 2019). It is shown that the HTMT results have met the predetermined criteria.

Table 3. Outer measurement results

Construct	Loadings Factors Scale	Composite Reliability	Cronbach Alpha	Average Variance Extracted
Coffee Waste Management Knowledge	0.738-0.773	0.863	0.860	0.643
Coffee Shop Owner Awareness	0.720-0.775	0.916	0.897	0.621
Attitude of Coffee Shop Owners	0.753-0.825	0.893	0.857	0.683
Coffee Waste Management Behavior	0.736-0.809	0.893	0.825	0.690

Table 4. Fornell-Larcker results

	ACSO	CSOA	CWMB	CWMK
ACSO	0.763429			
CSOA	0.946953	0.721671		
CWMB	0.777841	0.931715	0.767813	
CWMK	0.874092	0.967636	0.916912	0.73705

Note: ACSO = Attitude of Coffee Shop Owners; CSOA = Coffee Shop Owner Awareness; CWMB = Coffee Waste Management Behavior; CWMK = Coffee Waste Management Knowledge.

Table 5. Fornell-Larcker and HTMT results

	ACSO	CSOA	CWMB	CWMK
ACSO				
CSOA	0.682			
CWMB	0.739	0.688		
CWMK	0.771	0.701	0.765	

Note: ACSO = Attitude of Coffee Shop Owners; CSOA = Coffee Shop Owner Awareness; CWMB = Coffee Waste Management Behavior; CWMK = Coffee Waste Management Knowledge.

Table 6 shows that structural models can be evaluated by looking at the R-square (R²) on endogenous variables and the estimated value of the path parameter coefficient. A robust model is a model that has an R-square of 0.75, while a weak model has an R-square of 0.25 (Afthanorhan et al., 2020). The results of the R-Square analysis show that coffee shop owner awareness is strongly influenced by coffee waste management knowledge (93.6%); other variables outside the research model explain the remaining 6.4%. Meanwhile, the attitude of coffee shop owners is 92.5% influenced by coffee waste management knowledge and coffee shop owner's awareness; other variables outside the research model explain 7.5%. Finally, the independent variables of coffee shop owners' awareness and attitude influenced 97.8% of waste management behavior, and other variables outside the research model explain 2.2%.

The research analysis in Table 6 shows that the effect of coffee waste management knowledge increases coffee shop owner awareness with t-test 295.544 > t-table and P value 0.000 < 0.05, so the first hypothesis is confirmed. The H2 t-test is 16.658 > t-table, and the P value is 0.000 < 0.05, so the second hypothesis is confirmed; the H3 t-test is 44.334 > t-table, and the P value is 0.000 < 0.05 so that the third hypothesis is confirmed; the H4 t-test is 52.382 less than t-table 1.96 and a P value 0.000 greater than 0.05, and H5 t-test is 27.526 > t-table and P value 0.000 < 0.05 so that the fourth and fifth hypotheses are confirmed.

4. DISCUSSION

This study successfully achieved its goal of analyzing the knowledge of coffee shop owners in waste

management and their encouragement of innovative behaviors of converting waste into sustainable, environmentally friendly alternative energy.

Hypotheses testing is carried out by looking at the path coefficient value, which shows the parameter coefficient and the t-statistical value. The hypothesis is supported if the t-statistic is higher than the t-table value. In this study, for a 95% percent confidence level, the t-table value for the one-tailed hypothesis was > 1.64 (Sarstedt et al., 2020). The results of hypothesis testing with the bootstrapping procedure show the acceptance of all research hypotheses (H1-H5) because they passed the minimum required critical figure. This study recorded the first hypothesis as the holder of the highest significant influence in this study.

The results of the bootstrapping analysis confirm the effect of coffee waste management knowledge on coffee shop owner's awareness (H1). These results align with Faour-Klingbeil et al. (2015) and Sogut et al. (2020). This indicates the importance of strengthening the comprehensive understanding of downstream research users, in this case, coffee shop owners, to utilize the research results of developing alternative coffee energy. The collaboration of academics and entrepreneurs in development has a reasonably high-profit value (Rahab et al., 2016; Martini et al., 2012). The entrepreneurial spirit must be ecopreneurship to mitigate coffee waste (Masjud, 2020). It is also necessary to build collaborations with the government (Hartono et al., 2019). So, increasing the knowledge of the coffee entrepreneur regarding waste management will affect awareness in adding the value of coffee grounds. This knowledge could be increased by

Table 6. Hypotheses testing

Hypothesis	STD Beta	STD Error	T-Value	P-Value	Significance (P<0.05)	R-Square
H1: Coffee Waste Management Knowledge → Coffee Shop Owner's Awareness	0.968	0.968	295.544	0.000	Significant	0.936
H2: Coffee Waste Management Knowledge → Attitude of Coffee Shop Owners	0.663	0.661	16.658	0.000	Significant	
H3: Coffee Shop Owner's Awareness → Attitude of Coffee Shop Owners	1.588	1.587	44.334	0.000	Significant	0.974
H4: Coffee Shop Owner's Awareness → Coffee Waste Management Behavior	1.889	1.892	52.382	0.000	Significant	
H5: Attitude of Coffee Shop Owners → Coffee Waste Management Behavior	1.011	1.014	27.526	0.000	Significant	

upgrading through independent study, attending workshops, or comparative studies.

Next, this study accepts hypothesis on the influence of coffee waste management knowledge on the attitude of coffee shop owners (H2). This study is empirical evidence about the same relationship in the context of the application of business innovation (Ramnauth et al., 2008; Taneo et al., 2020; Lang et al., 2020). The knowledge of coffee shop entrepreneurs about the alternative energy of coffee grounds waste to economic value will form a paradigm of being innovative and profitable in looking at the benefits of coffee grounds waste. This study also accepts H3, which indicates the importance of awareness in influencing the attitude of coffee shop owners in utilizing coffee grounds waste as alternative energy for business operations or the development of new products for the community.

The fourth and fifth hypotheses are also accepted. The significant influence of business owner's awareness affects innovative business management behavior. The awareness of coffee shop owners with the potential of coffee grounds waste as a new business field shapes the behavior of coffee shop owners who reduce coffee grounds waste to be more positively impactful, economically valuable, and environmentally friendly in the coffee shop industry. In addition to awareness, there is a drive in coffee shop owners' attitudes toward the benefits of processing coffee grounds waste as alternative energy (H5). Coffee shop owners who are satisfied with the maximum effort to manage coffee raw materials without a problem and become a driver of coffee shop business growth will strive to make coffee grounds a new business channel that positively impacts the economy and the environment. This means that coffee waste management knowledge is accompanied by real action by the coffee shop owner and his management to achieve a sustainable coffee shop. The primary strategies for social enterprise sustainability include innovation, cooperation, adapting to changing societal demands, and utilizing their resources; the action to implement the plan is next critical (Desiana et al., 2022).

The results show that the owner and all the coffee shop actors initially only slightly considered sorting coffee grounds. Waste management is carried out by producers directly at the source

so that it can be sorted or composted on an individual scale (Mahartin, 2023). However, they have sufficient knowledge, awareness, attitude, and behavior toward coffee grounds management but are not accompanied by real action in its implementation. When they do coffee waste management, it includes protecting the environment and sustainable coffee shops so that they can provide good service to consumers. Excellent and clean service will make consumers comfortable (Ilyas & Sari, 2021). The sustainable coffee shop will give a positive impression to consumers who visit the shop. This positive impression can provide added value and satisfaction. The dominant coffee shop visitors are young people starting to be aware of a sustainable environment (Suryani & Kristyani, 2021). Therefore, the management of coffee grounds waste is following the current situation.

In particular, a coffee grounds collection scheme for all coffee shops greatly influences centralized waste management with product conversion that can be mass-produced and commercialized in a broad market. The coffee shop waste can be distinguished from coffee grounds waste when washing glasses or collecting grounds from coffee brewing machines. If the ground is left on the water sink, it will affect the environment, especially the water system. It needs a high removal cost of the environmental pollutants to remove the waste (López-Serrano et al., 2023).

In terms of academic implications, this study encourages the collaboration of academics and coffee shop owners in developing circular products of coffee ground waste as an alternative fuel for the general public. With the government's support as a supporting party amid two parties in a sustainable alternative energy development scheme, this is easier to realize by providing production equipment. As a sustainable development strategy for sustainable resources, waste management policy must transition to the circular economy (Ratnasari et al., 2023). The production of fuel from the conversion of coffee grounds waste can be carried out en masse through the collection and treatment of waste schemes. Coffee waste management is a form of green economy development through the migration of sustainable circular micro industries.

This study found that coffee shop entrepreneurs' knowledge, awareness, attitudes, and behavior greatly influenced coffee grounds management activities. The option to manage coffee grounds promoted by coffee shop owners should be a concern for minimizing environmental pollution and maximizing the potential of ground

waste to economic value. It means that the entrepreneur, as the brain of the coffee shop owner, can be innovative. It is essential to strengthen the human resources of the coffee owner, which can then be passed on to their employees. This condition can create environmental and economic sustainability for the coffee shop.

CONCLUSION

This study aims to discover how coffee shop actors decide to mitigate coffee grounds waste. Overall, this study has succeeded in showing the contribution of previous research on coffee shop entrepreneurs' perspective on waste management, especially in coffee shops that are environmentally friendly and maximize resources effectively. This study encourages traditional and modern coffee shops to start thinking science-based in applying that perspective to sustainable business to create innovation for gaining maximum business profits. The coffee waste treatment process will be better if the coffee shop has human resources or machines in the alternative energy conversion process.

On the business side, this study looks at two decisions to be determined and strategies for converting alternative energy to coffee grounds. However, if business owners want to make alternative energy products from coffee grounds waste, a green marketing strategy with the business potential for foreign exports is needed. This study concludes that the knowledge of waste management of coffee shop owners influences awareness and positive attitudes in maximizing the potential of coffee grounds as an environmentally friendly alternative energy source. In addition, the attitude and awareness of business owners toward the potential of coffee grounds waste encourage coffee shop entrepreneurs to carry out better management of coffee grounds waste through sorting procedures to decisions on the results of the conversion of coffee grounds waste as alternative energy.

AUTHOR CONTRIBUTIONS

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ACKNOWLEDGMENT

This study is funded by the Directorate of Research and Development, Universitas Indonesia, under Hibah PUTI 2022 (Grant No. NKB-1364/UN2.RST/HKP.05.00/2022).

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